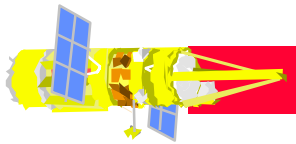
General Session Agenda



- 0700-0800 Registration
- 0800-0815 Welcome
- 0815-0830 Administrative Items
- 0830-1000 Project Description
- 1000-1020 Break
- 1020-1045 Project Description
- 1045-1145 Acquisition Approaches
- 1145-1200 Questions/Concluding Remarks

SBL Industry Day

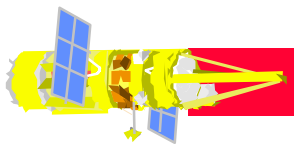
Exploiting New Dimensions in Space

AF SBL Project Office
SMC/ADEL
LAAFB CA

26 Aug 97

Internet Address:
sblrd@afbmd.laafb.af.mil

General Session Agenda



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Space and Missile Systems Center

Executive Director

Mr Maikisch

WELCOME

Mission

SMC strengthens our nation's security by providing integrated, affordable systems for the control and exploitation of air and space

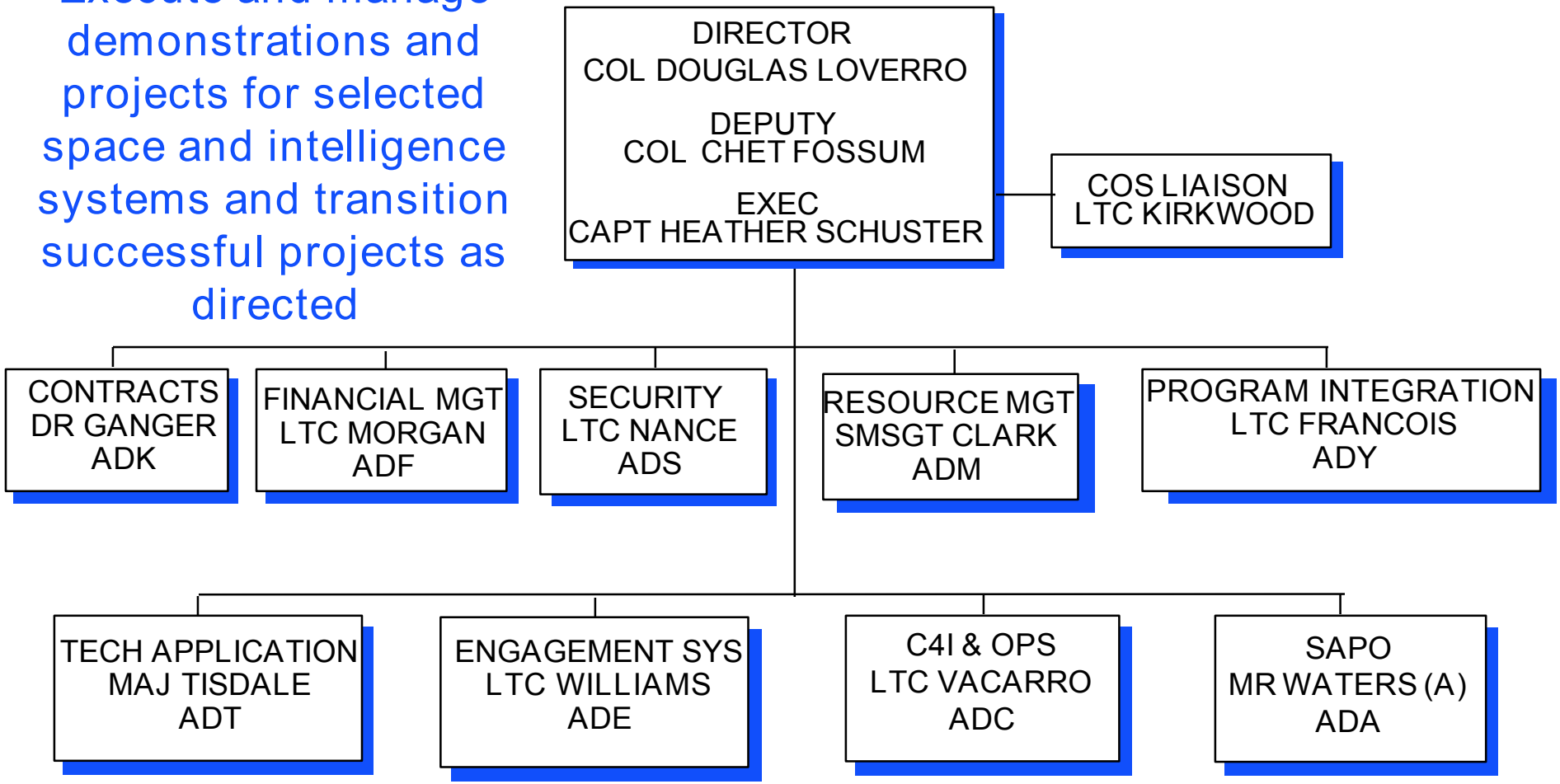
Vision

Forging the shape of space for tomorrow's battlefield

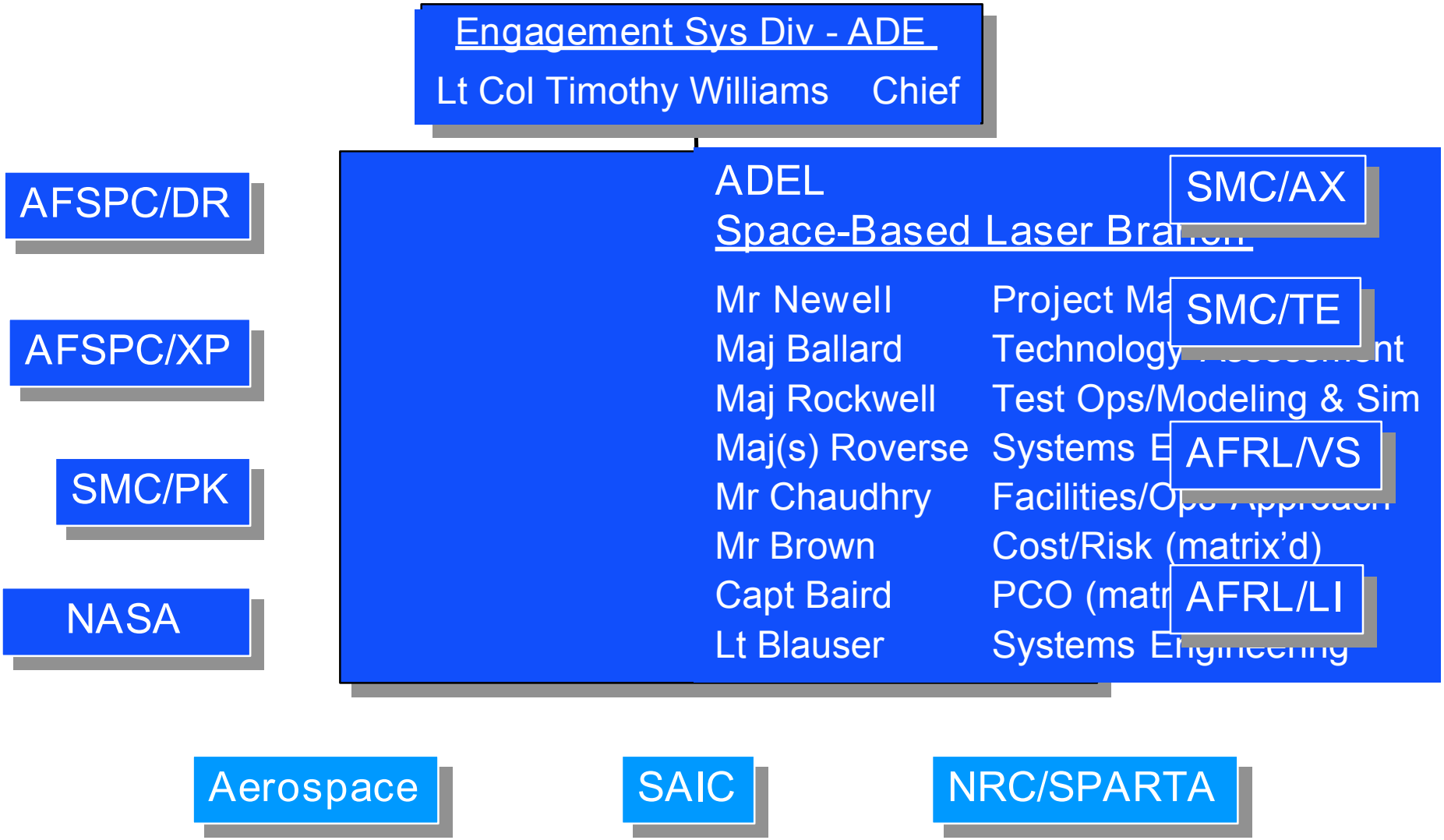
SMC/AD
Advanced Systems Directorate

Mission

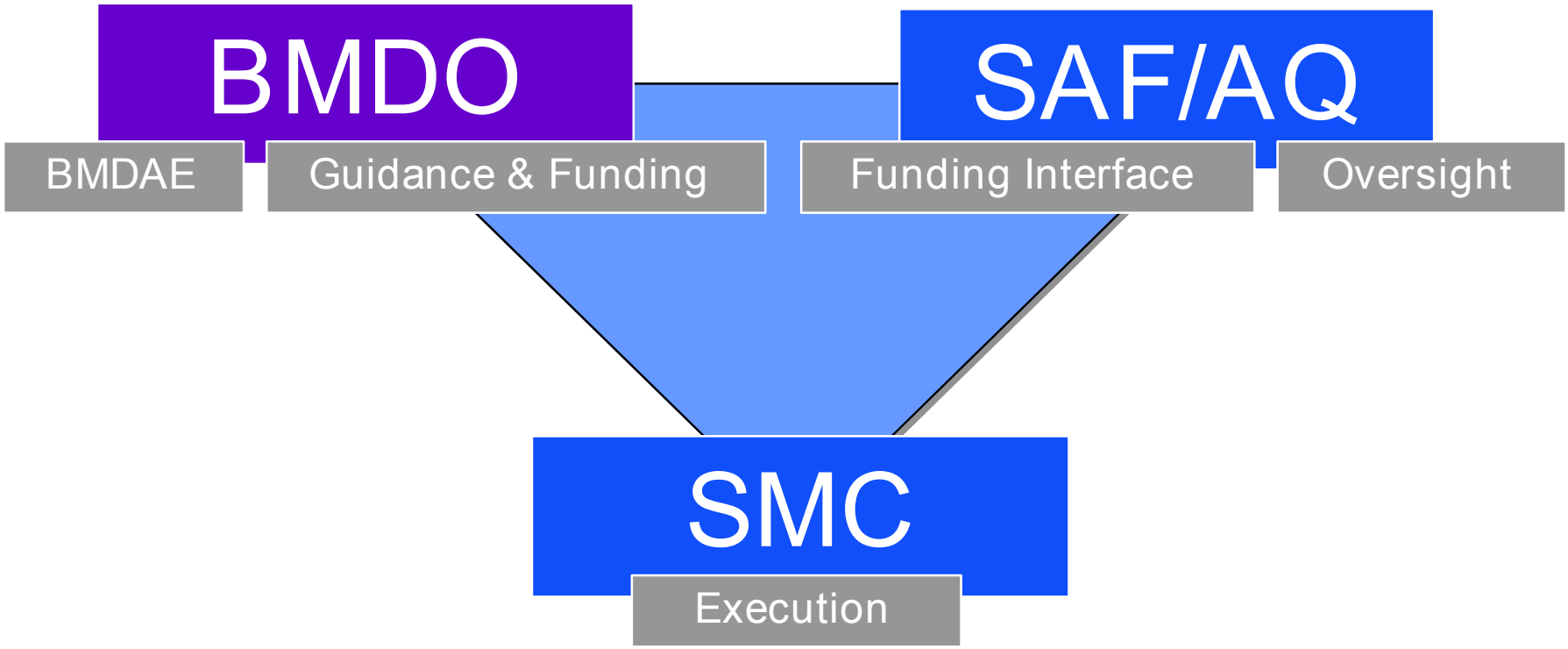
Execute and manage demonstrations and projects for selected space and intelligence systems and transition successful projects as directed



AF SBL Project Team

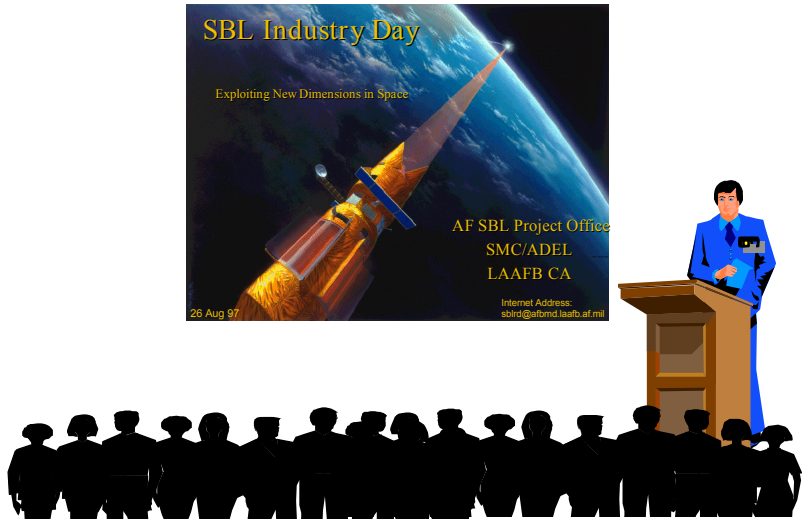


SBLRD Project Execution



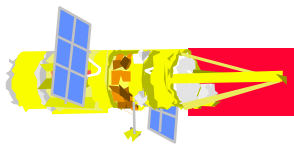
Industry Day Objectives

- Initiate industry involvement
- Obtain industry recommendations on executing SBL project
- Gain understanding of industry capability to perform SBL project
- Gain understanding of technological advances applicable to the SBL project



We want to hear from you

General Session Agenda



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Industry Days Agenda

- 26 Aug 97
  - AM - General Session
    - Building A-1 Conference Room 1062
    - UNCLASSIFIED
  - PM - Individual KTR Acquisition Strategy Sessions
    - Building A-1 Conference Room 1082
    - Up to SECRET
- 27 Aug 97
  - AM & PM - Individual KTR Technical Sessions
    - Building A-1 Conference Room 1082
    - Up to SECRET

Ground Rules

- Open session
  - Government will attempt to answer all questions
  - Request all questions be submitted in writing
  - Q&As will be posted on WWW
- Individual acquisition oriented sessions
  - Government will protect proprietary/company private information
  - Intent is to capitalize on good ideas
  - Answers providing clarifications or additional detail will be posted
- Individual technical interchange sessions
  - Government will protect proprietary/company private information
  - Purpose is to ensure viable technologies not precluded
- All comments/questions on a non-attribution basis

Open, frank dialogue is the goal!!

Disclaimers

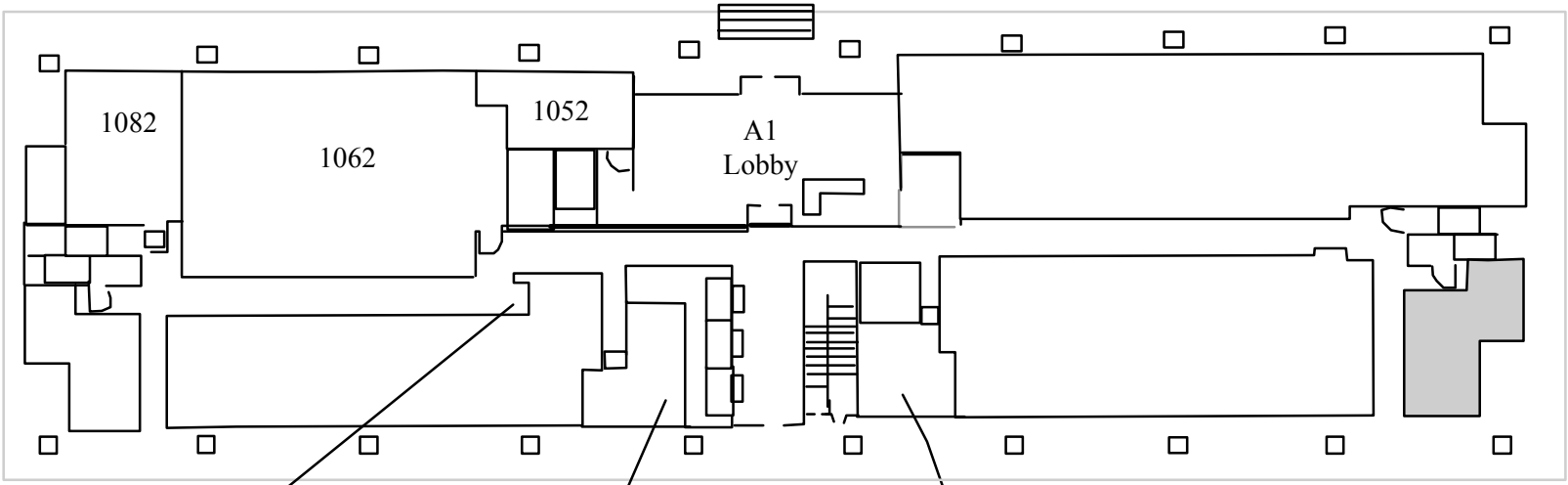
- Information presented is current, but subject to change
- The Government is not committed to an acquisition at this time
  - Expenses for participating in the RFI and Industry Days or formulating an approach in anticipation of any acquisition is solely yours
- Information presented at any time during this meeting shall not be construed to obligate the Government in any way

Administrative Notes

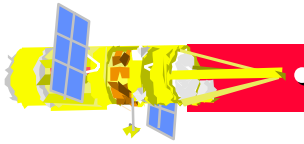
- Badging
  - Unescorted entry for:
    - Conference Rooms 1052, 1062, and 1082 in Building A-1
    - Dining Room in A-3
  - Not for use in visiting any other offices or buildings
  - Turn in badges before leaving Aerospace facility
- Messages
  - Incoming: Phone Calls (310) 363-8682, Faxes (310) 363-8636
  - Outgoing: See location of phones in facilities map
- Questions
  - Please use forms provided in package

Conference Facilities

Aerospace Corporation
Building A-1



General Session Agenda



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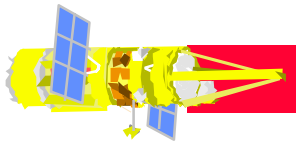
What we will avoid

Project Description



- Background
- Demonstration Overview
- Development Concept & On-going Efforts
- Technical Library
- Acquisition Factors

Support for SBL

"Space-based laser is clearly the future national missile defense system of choice." - Sen. Lott, Majority Leader

"...I agree with the opinions expressed by Dr Kaminski and LTG O'Neil that SBL provides a promising missile defense capability. ...Given the world-wide proliferation of technologies for ballistic missiles and weapons of mass destruction, we must continue to pursue this high value option..." - Lt Gen Lyles, as SMC/CC

Independent Review Team (IRT)

Chartered by BMDO/D, Lt Gen Lyles

Gen Larry Welch, USAF (Ret), Chairman
Gen Bernard Randolph, USAF (Ret)
Maj Gen Donald Lamberson, USAF (Ret)
Maj Gen Robert Rankine, USAF (Ret)
Lt Col John London, USAF
Dr. Michael Frankel
Dr. William Graham
Dr. Arthur Guenther
Dr. Alfred Skolnick

IRT Key Findings:

- Many critical technologies demonstrated, some key components to be demonstrated
- An SBL technology-integration demonstration in space is critical
- Moderate risk demo feasible ~2005 if technology developments proceed as planned
- Significant technology development required for an operational system
- An end-to-end Integrated Ground Test essential before launch of demonstrator
- Management and support enhanced if Service (i.e., AF) executed

SASC on SBL

"The committee supports the efforts of the U.S. Air Force and BMDO to develop a joint program for proceeding toward a space-based laser (SBL) flight demonstrator."

"According to the SBL-IRT, the most prudent course for the SBL is to proceed on a low risk program that could lead to a launch of an ABM Treaty compliant space demonstrator in fiscal year 2005."

"The committee endorses the SBL-IRT recommendations and recommends an increase of $118.0 million in PE 63173C to begin implementing them."

Funding & Program History

- Chemical Hydrogen-Fluoride (HF) laser started in '70s
  - $1B+ SBL investment
  - DARPA ➡ BMDO
    - Technology execution by the Army, Navy & Air Force
- Zenith Star space demo initiated in '88
  - Refocused in '91 to be high-power, integrated lab technology demo [Alpha-LAMP Integration (ALI)]
- SBL funded at $30M/yr through FYDP in FY96
  - In FY95, ALI scheduled to terminate after high energy tests in FY97
- Congress appears intent on funding demonstrator

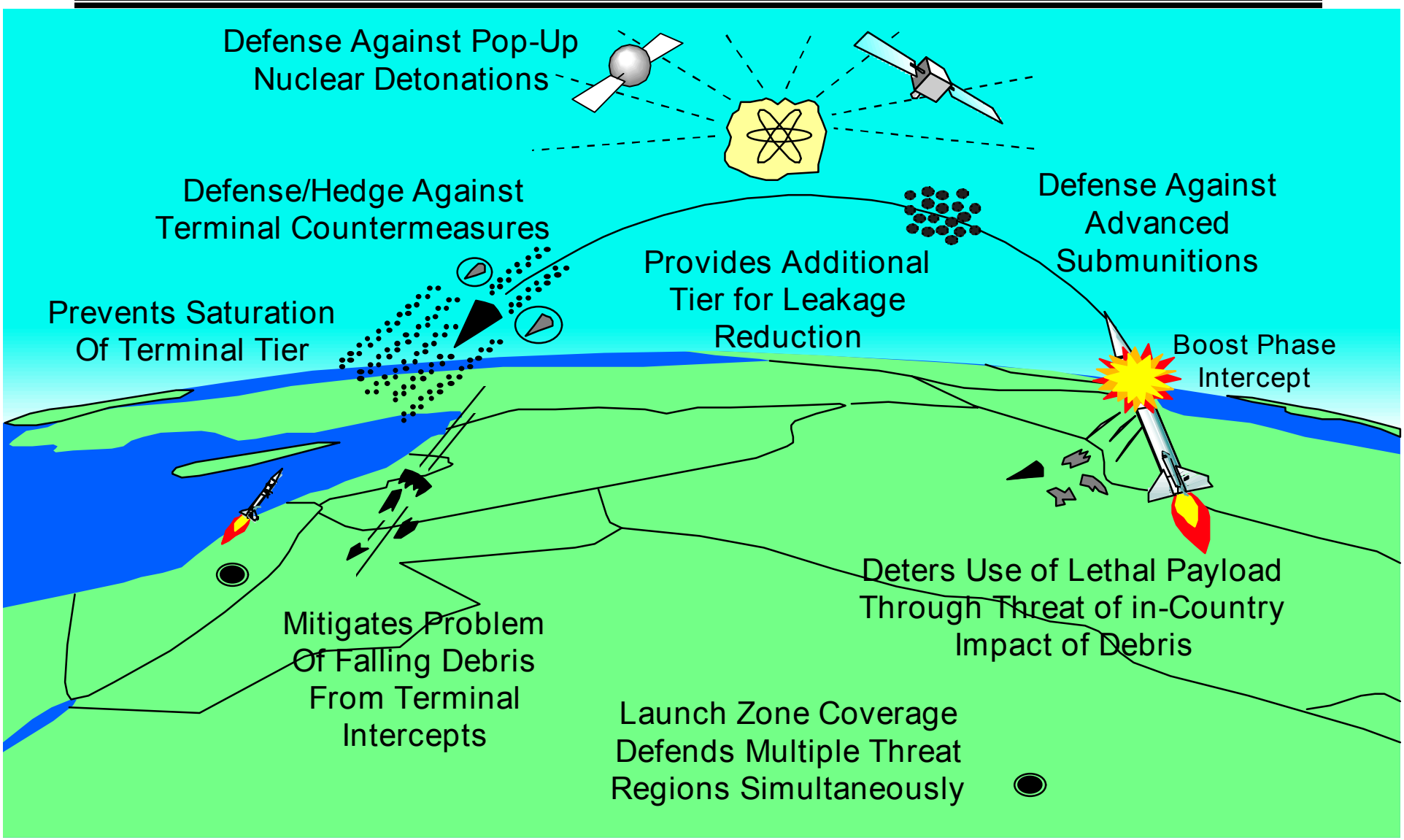
$M	FY96	97	98	99	00	01	02	03
POM	24.0	28.4	28.9	28.7	28.4	27.8	28.4	28.9
Congressional Adds								
	50.0	70.0	? (Senate approved $118)					
TOTALS	74.0	98.4	146.9?	?	?	?	?	?

Need for SBL System

- Ballistic missile threat growth:
  - Global
    - Range, Number of producers, Number of nations with capability
  - Lethal
    - Warheads using weapons of mass destruction (WMD), Accuracy, Terminal defense countermeasures
- Need quick response, anywhere & anytime:
  - Boost Phase Intercept (BPI)
  - Global, survivable, continuous, near-instantaneous

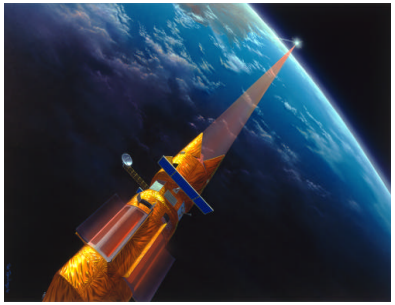
"Our missiles cannot reach Washington. If they could reach Washington, we would strike if the need arose." - Saddam Hussein

Rationale for Boost Phase Defense



ABL and SBL

Airborne Laser
(ABL)

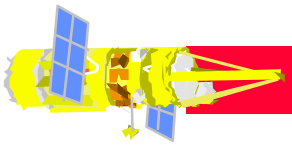


Space-Based Laser
(SBL)

- AF committed to developing, building and fielding ABL
- AF committed to executing SBL project for BMDO

Synergistic, not duplicative

Project Description



- Background
- Demonstration Overview
- Development Concept & On-going Efforts
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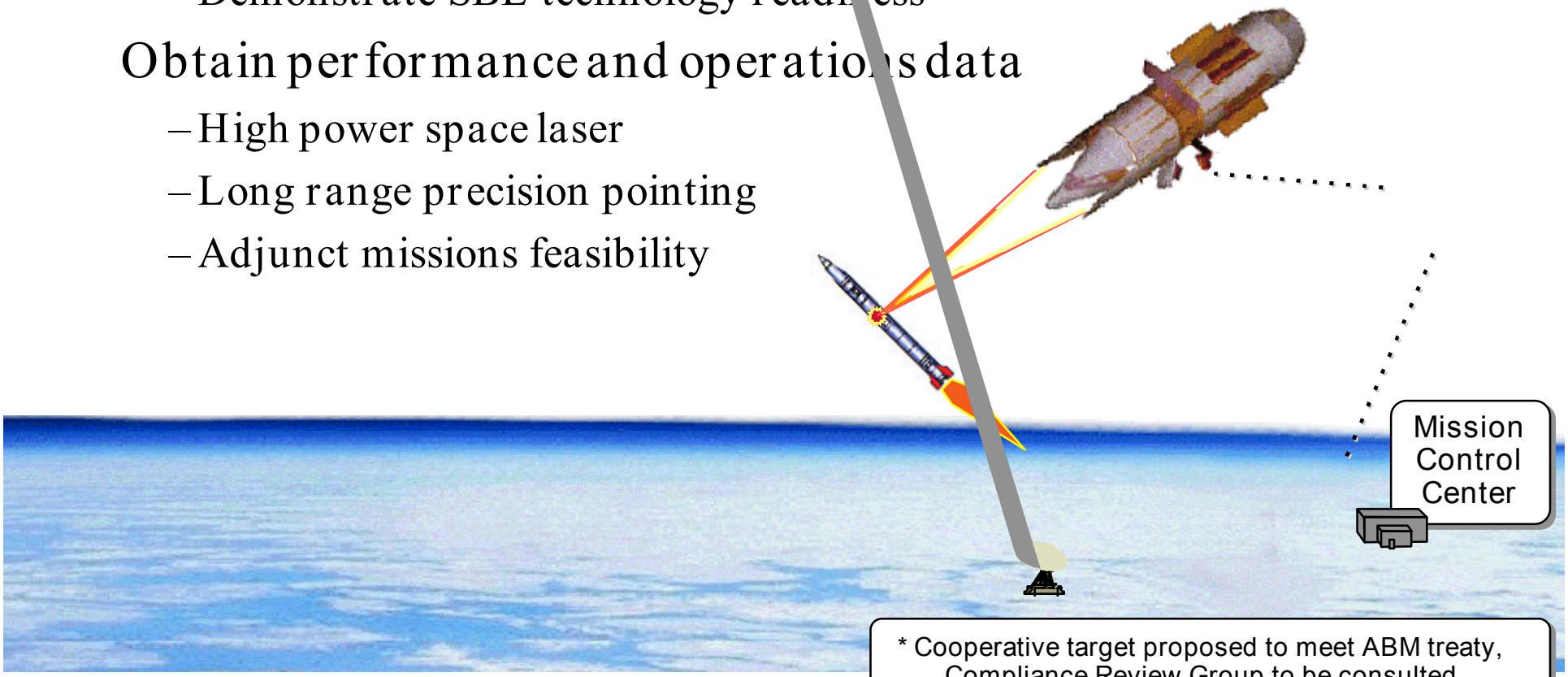
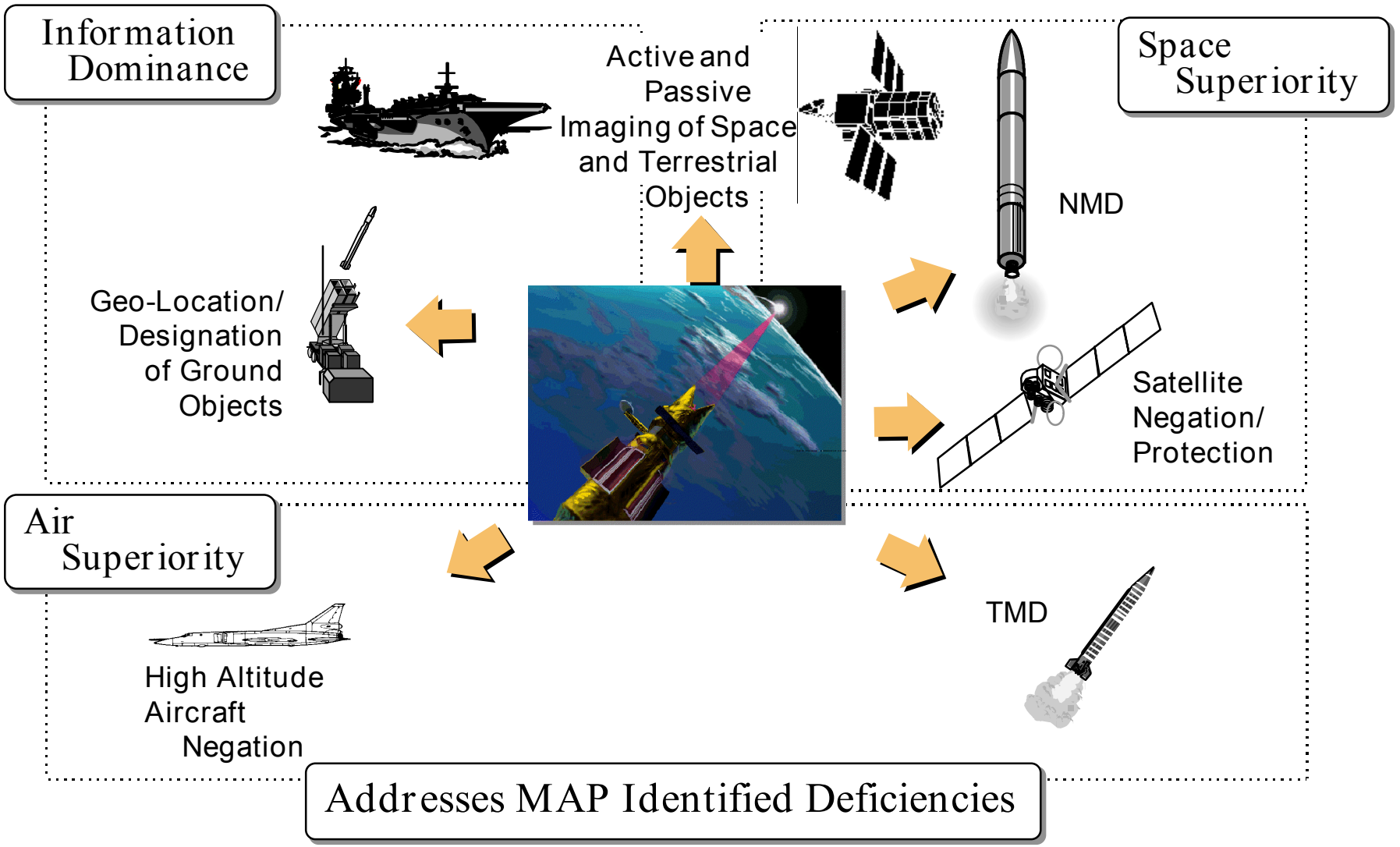
Demonstration Objectives

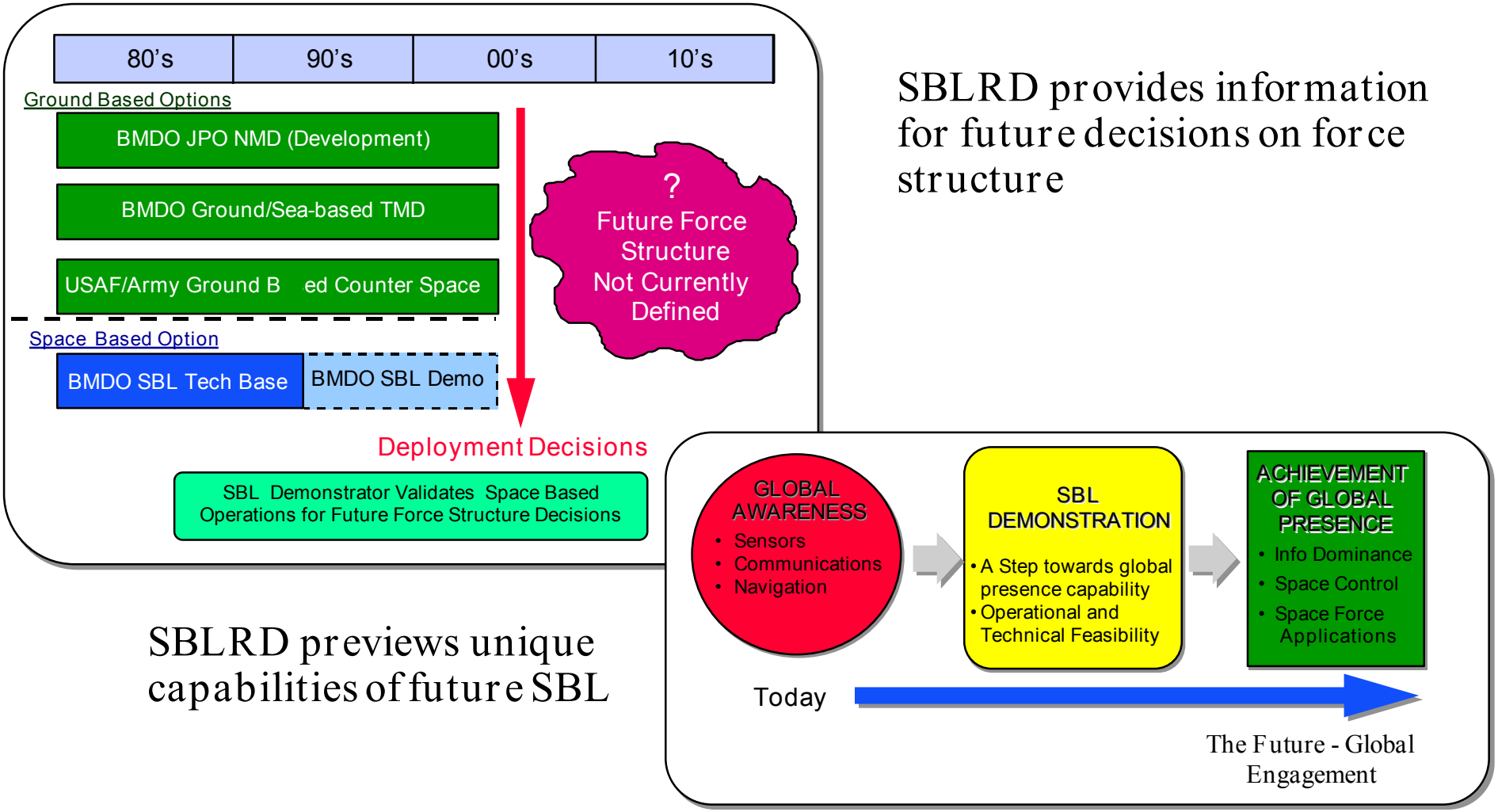
- Validate SBL as a viable option for missile defense
  - Destroy a boosting target from space
  - Demonstrate SBL technology readiness
- Obtain performance and operations data
  - High power space laser
  - Long range precision pointing
  - Adjunct missions feasibility



SBLRD Provides Opportunity To Evaluate Potential For User Missions



SBLRD Provides Information To Support Force Structure Decisions

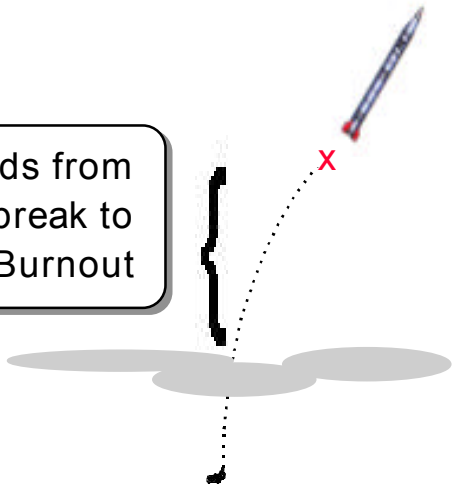


SBLRD provides information for future decisions on force structure

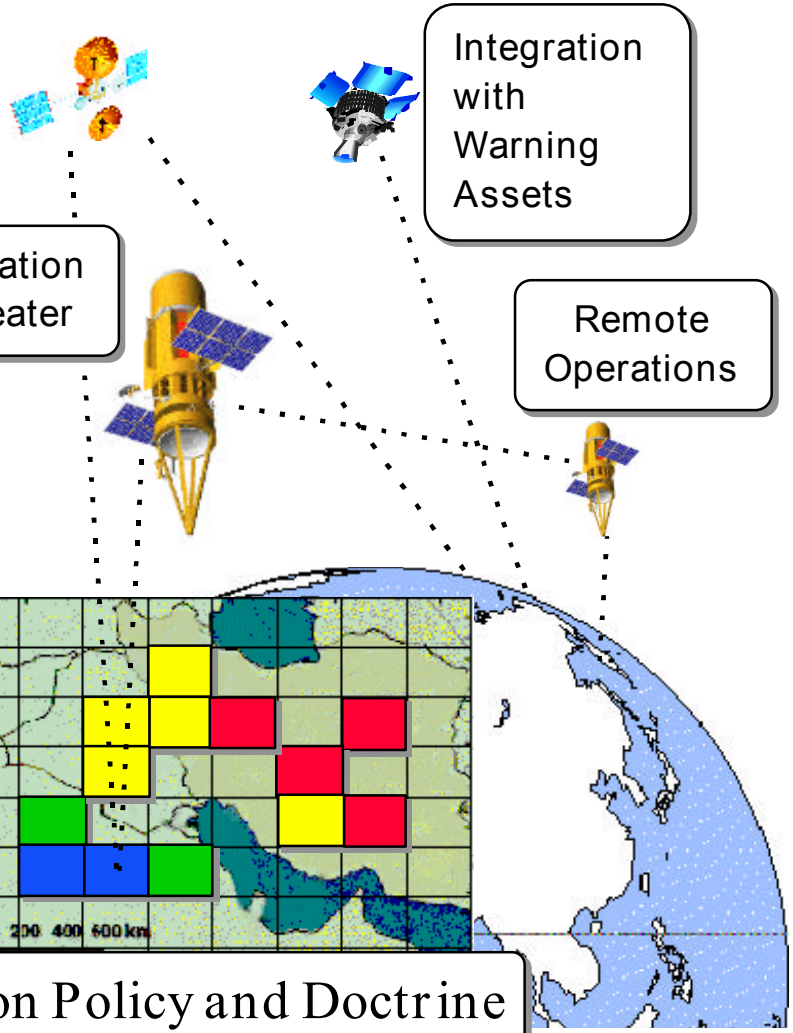
SBLRD previews unique capabilities of future SBL

SBLRD Provides Opportunity To Investigate Operations

C^2 of Space Weapon Issues
- Timelines
- Human-in-Control
- CONUS vs Theater battle Mgt
- Integration with other assets



Seconds from Cloudbreak to Burnout



Integration with Warning Assets

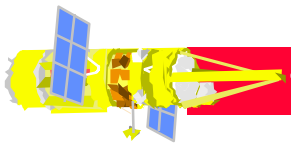
Coordination with Theater

Remote Operations

Rules of Engagement Based on Threat Level for Location

Basis to Develop Space Based Force Projection Policy and Doctrine

Project Description



- Background
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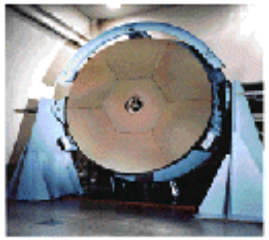
- Acquisition Factors

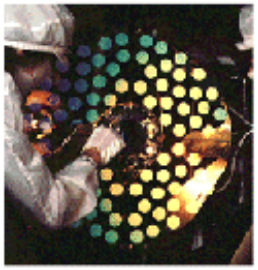
Space-Based Laser Development Concept

DEMONSTRATED TECHNOLOGIES

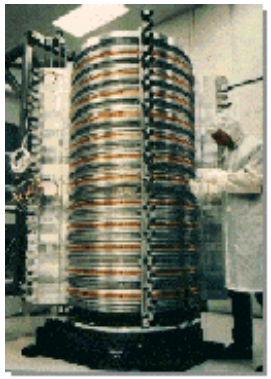
Large Optics
(LAMP, 1989)



Beam Control
(LODE, 1987)

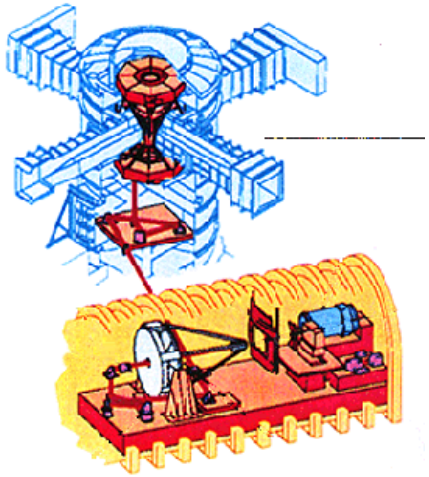


Laser
(ALPHA, 1991)



INTEGRATION

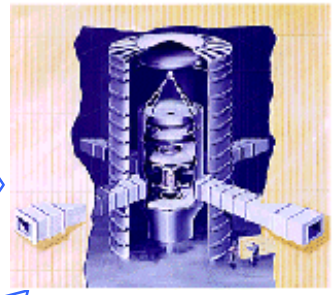
Alpha-LAMP Integration (ALI)
End-to-End Weapon Element Testing



Acquisition, Tracking, Pointing & Fire Control
(High Altitude Balloon Experiment [HABE])

SYSTEM-LEVEL DEVELOPMENT

Integrated Ground Test



Demonstrator

Future Operational SBL Option

On-Going Contracts/Efforts

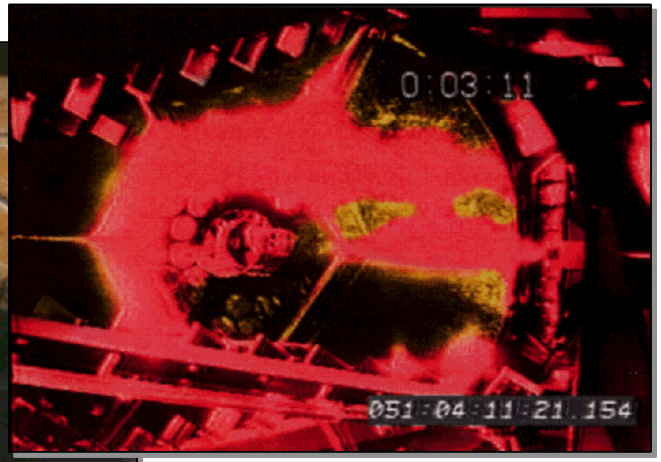
- Zenith Star
- Alpha Laser Optimization (ALO)
- Advanced Nozzle Technology Program (i.e., HYLTE)
- Advanced Beam Control System (ABCS)
- High Altitude Balloon Experiment (HABE)
- Fire Control Program

Scope of these efforts fall under SBL project

Zenith Star

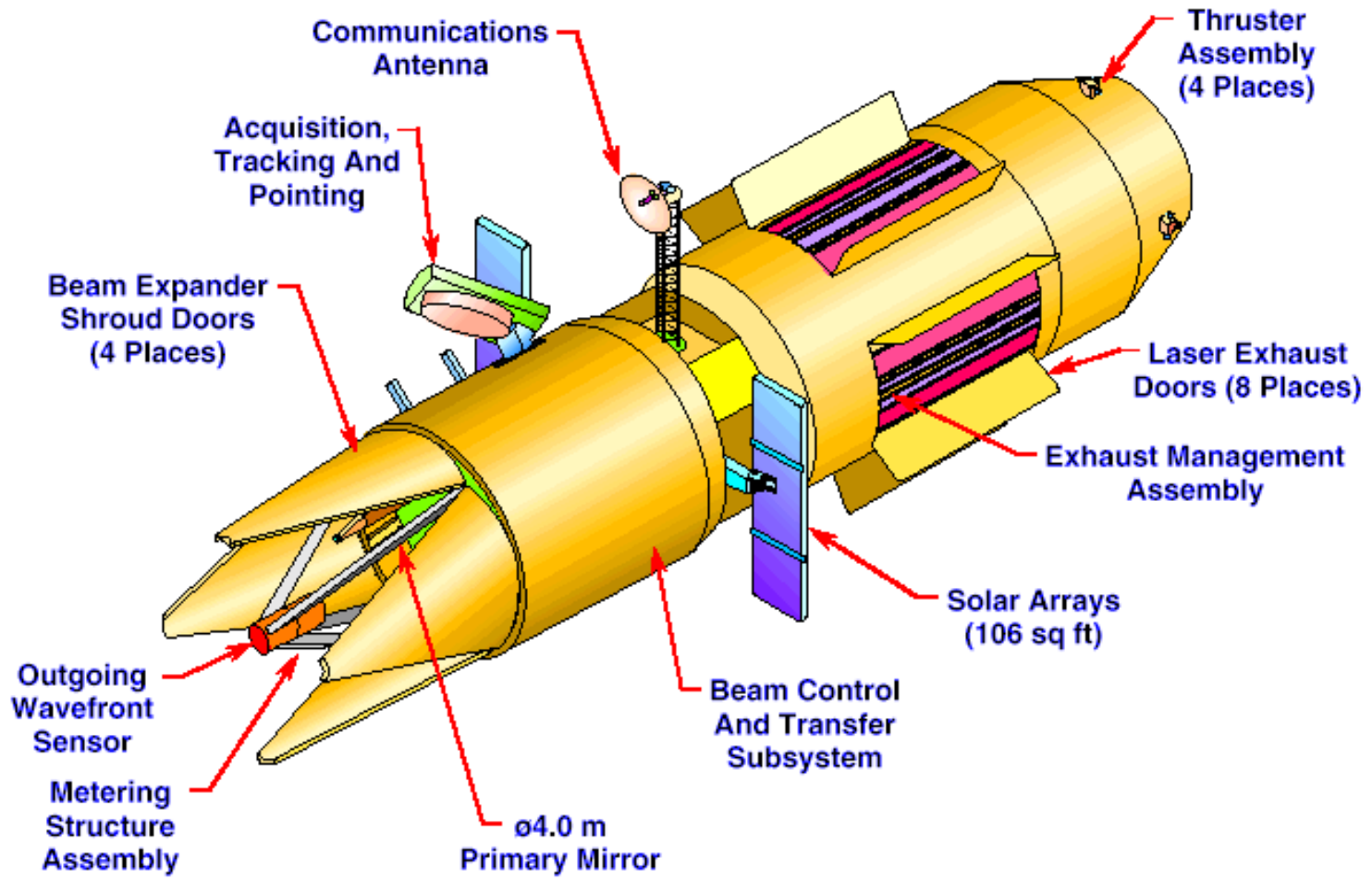
- Alpha LAMP Integration (ALI)
  - Demonstrate key technologies work as a system
  - Developing uncooled deformable mirror
  - Primary Mirror facility work
- SBLRD Design
  - Tailored PDR work in progress
  - Laser Test Facility (LTF) Requirements
- Resonator Optics Material Assessment (ROMA)
  - Very low absorption (VLA) mirror coating proofs completing effort
  - Uncooled mirror technology under transition to ALO
- Fire Control Brassboard
- BMDO contract with Lockheed Martin Astronautics

ALI at Capistrano Test Site

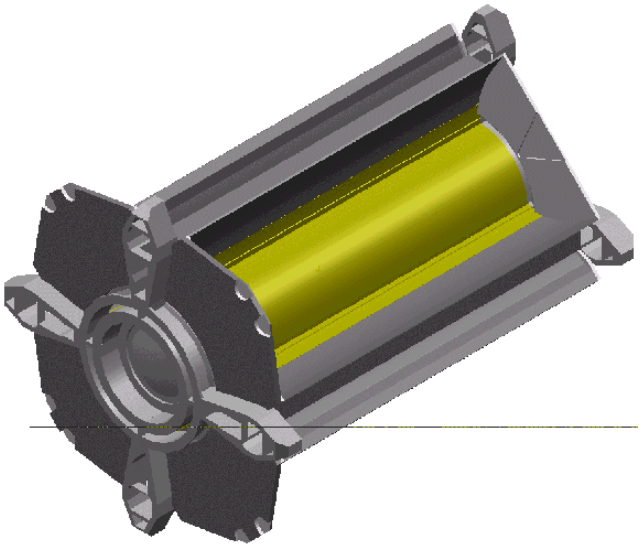


- 1st ALI High Power Test (Open Loop) - 20 Feb
- 1st Closed Loop Test (with Fast Steering Mirror- [FSM]) - 16 Jul
  - .5 s of closed loop ops
- 2nd Closed Loop Test (with FSM and Deformable Mirror) - Mid Sep

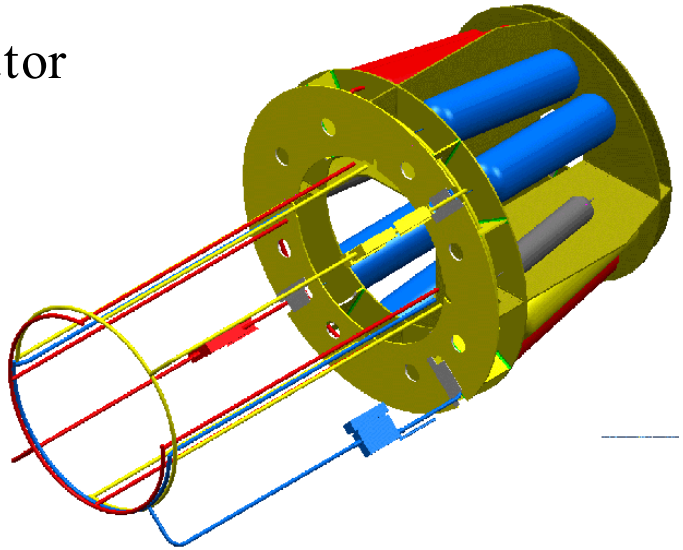
Readiness Demonstrator
Current Contractor Concept



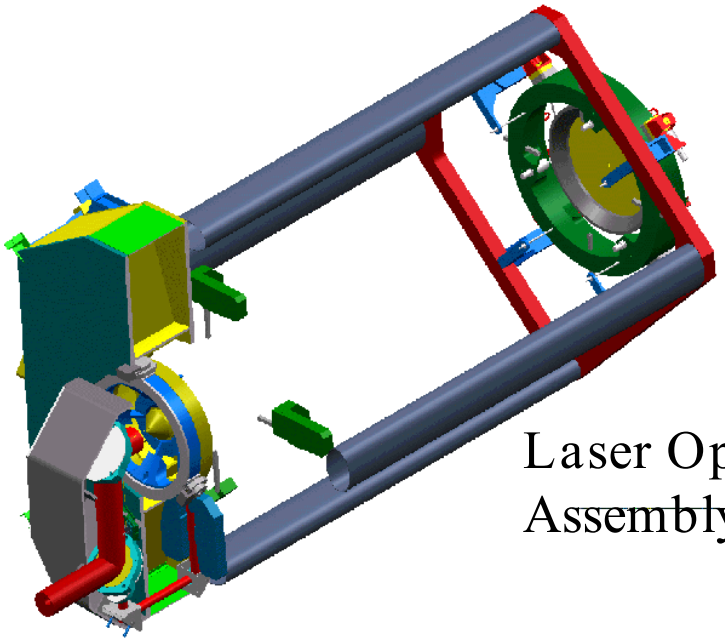
Laser Payload Element
Current Contractor Concept



Laser Gain Generator
Assembly (GGA)

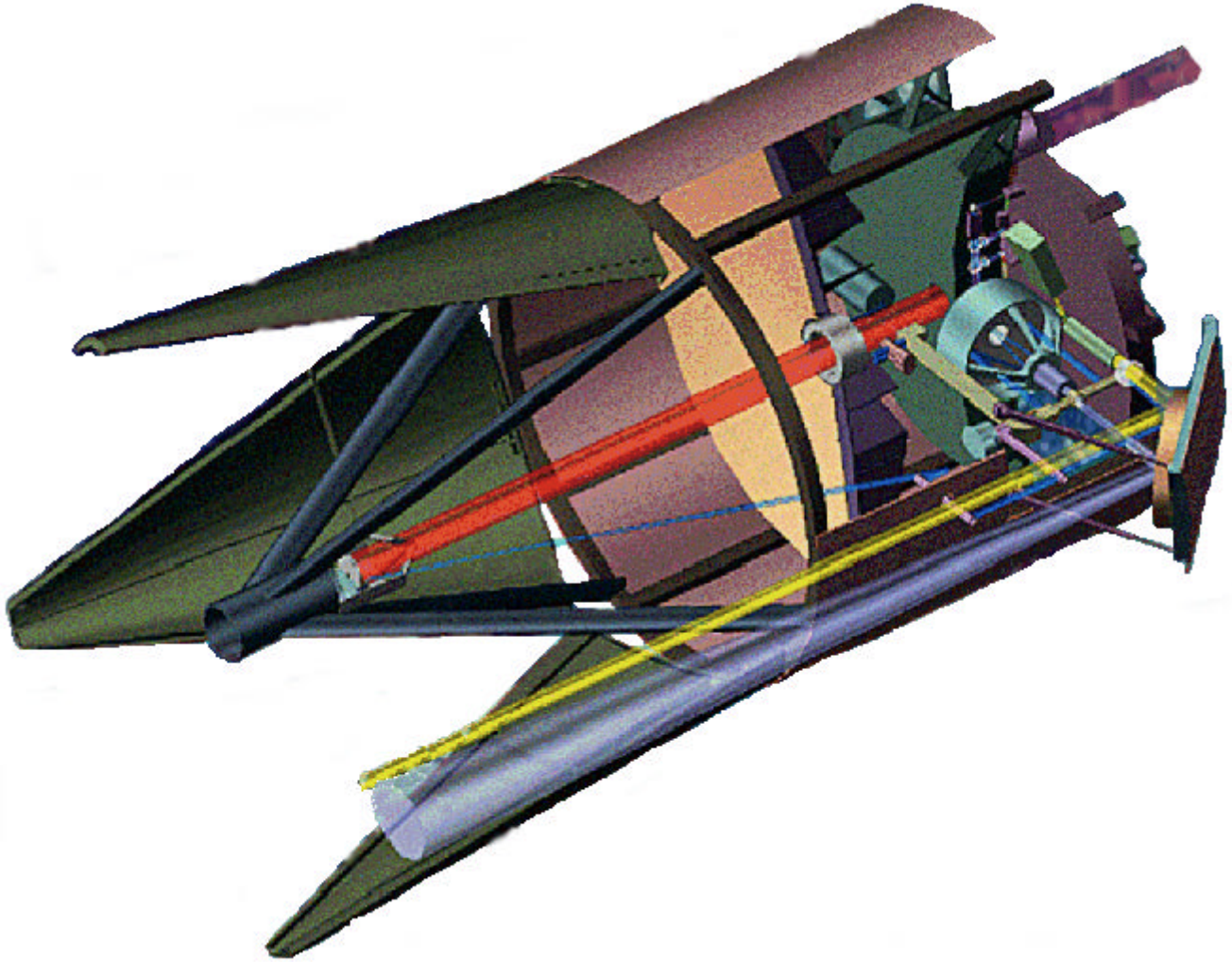


Reactant Storage and
Feed Subsystem (RSFS)



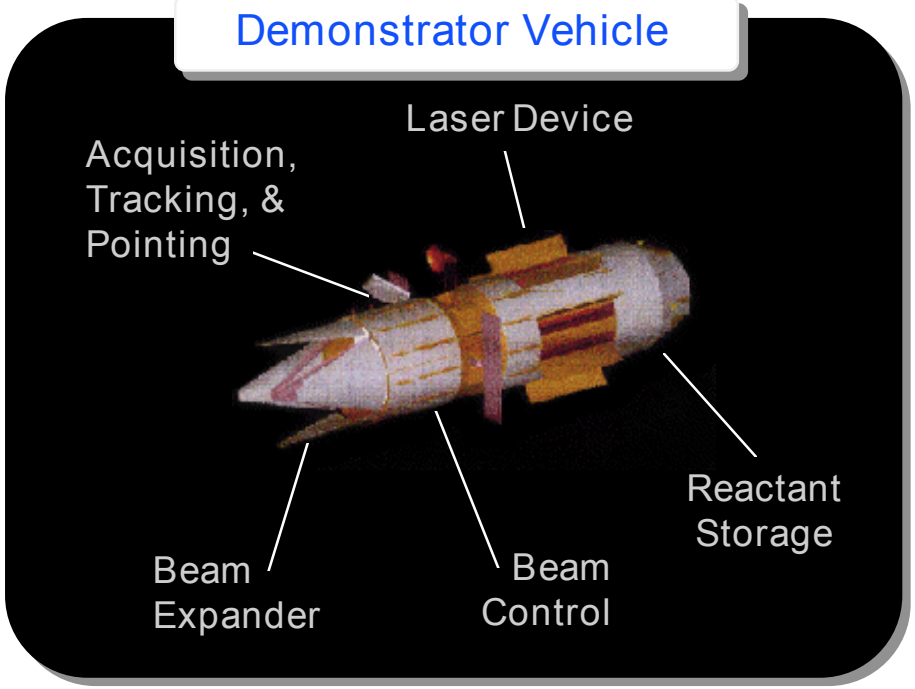
Laser Optical Bench
Assembly (OBA)

Optical Payload Element
Current Contractor Concept



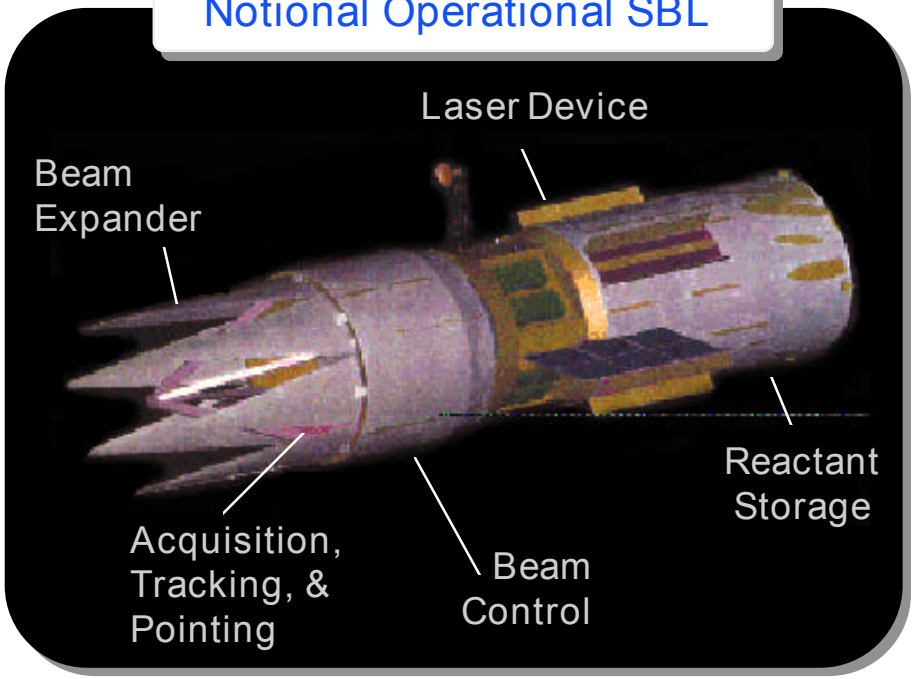
Comparison of SBL Demonstrator and BMDO Operational Vehicle Concepts

Demonstrator Vehicle



- Size: 4.5 x 20 meters, ~40,000 lb.
- Brightness: X
- <1000km range with ~ 15 shots
- 1.5 - 3 years in 400km orbit

Notional Operational SBL



- Size: 9 x 32 meters, ~80,000 lb.
- Brightness: ~ 10X
- >4000km range with ~100 shots
- 16 years in 1300km orbit, 20 w/servicing
- On-orbit refueling and maintenance

Alpha Laser Optimization (ALO)

- Objective is to improve Alpha's:
  - Producibility, affordability, space operability, scaleability
- Areas of current focus:
  - Full scale laser resonator optics fabrication
    - Full scale annular optic
    - Silicon carbide integrating structure proofs
    - Reactivation of Lawrence Livermore National Laboratory's Large Optics Diamond Turning Machine (LODTM)
  - Autonomous resonator optics alignment
- BMDO contract with TRW

Advanced Beam Control System (ABCS)

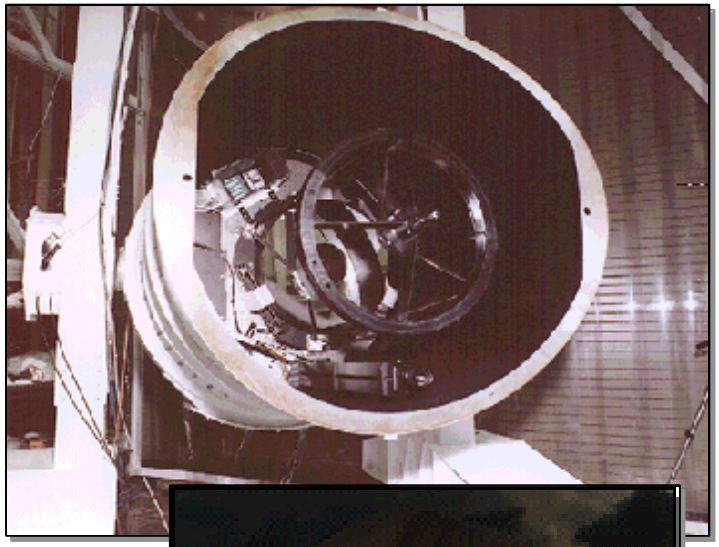
- Algorithms and techniques for autonomous boresighting and alignment of:
  - Laser Resonator
  - Beam control elements
    - Deformable
    - Primary
    - Secondary
  - Acquisition, tracking and pointing (ATP) system
- Navy contract with Hughes Danbury Optical Systems

Advanced Nozzle Technology Program

- Hypersonic Low Temperature {nozzle} (HYLTE) gain generator concept
  - Improved Alpha laser efficiency
    - Higher power
    - More runtime for same amount of reactant
- Current SBLRD concept uses HYLTE design for low energy laser
- Army contract with TRW

High Altitude Balloon Experiment (HABE)

- Recoverable, reusable ATP/FC payload
  - Demonstrate autonomous, end-to-end operation of key ATP/FC functions
  - Realistic environment, timelines, targets
- Currently in integration
- Test Plans
  - Ground tests against model targets
  - Mountain top engagements at White Sands Missile Range (WSMR)
  - Balloon-borne tests at WSMR
- AF contract with Kaman Sciences



Fire Control Program

- Integrated engagement management
  - Image processing/control decision function technologies
  - Addresses numerous issues:
    - Multi-target tracking, Target selection, Plume-to-hardbody handover, Target ID, Aimpoint determination and selection, Damage assessment
  - Attack Management Development Framework (AMDF)
    - Software/hardware/simulation environment for creation and validation of ATP/FC algorithms
    - AMDF incorporated into HABE simulation
    - SBL model incorporated allows system performance estimates
- AF conducted study

Systems Engineering & Technical Assistance

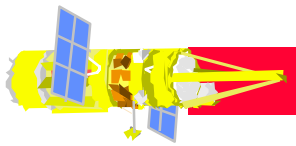
- ALI/ALO Support
  - Integration support
  - Design and performance analysis
  - Thermal-distortion analysis
  - Transient performance analysis
- SBLRD design and performance analysis
  - CARD
  - Laser power analysis
- BMDO contract with Schafer

Non-SBLRD SBL Efforts

- Future operational vehicle concept design analysis
  - BMDO, Schafer, Zenith Star contractors
- Future launch vehicle analysis
  - BMDO, AFRL, NASA, Truax, Microcosm
- Operations concept studies
  - BMDO, AFSPC, SMC, SSDC
- Operator console modeling & sim
  - BMDO, SMC, SAIC
- Future operational system architecture modeling & sim
  - BMDO, Logica, SAIC, Schafer
- Phase conjugation technology
  - BMDO, ONR, TRW
- War game participation
  - BMDO, OSD/NA, SMC

Project Description

- Background
- Demonstration Overview
- Development Concept & On-going Efforts
- Technical Library
- Acquisition Factors

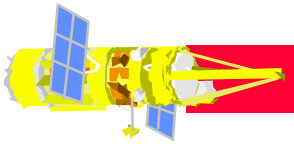


SBL Technical Library

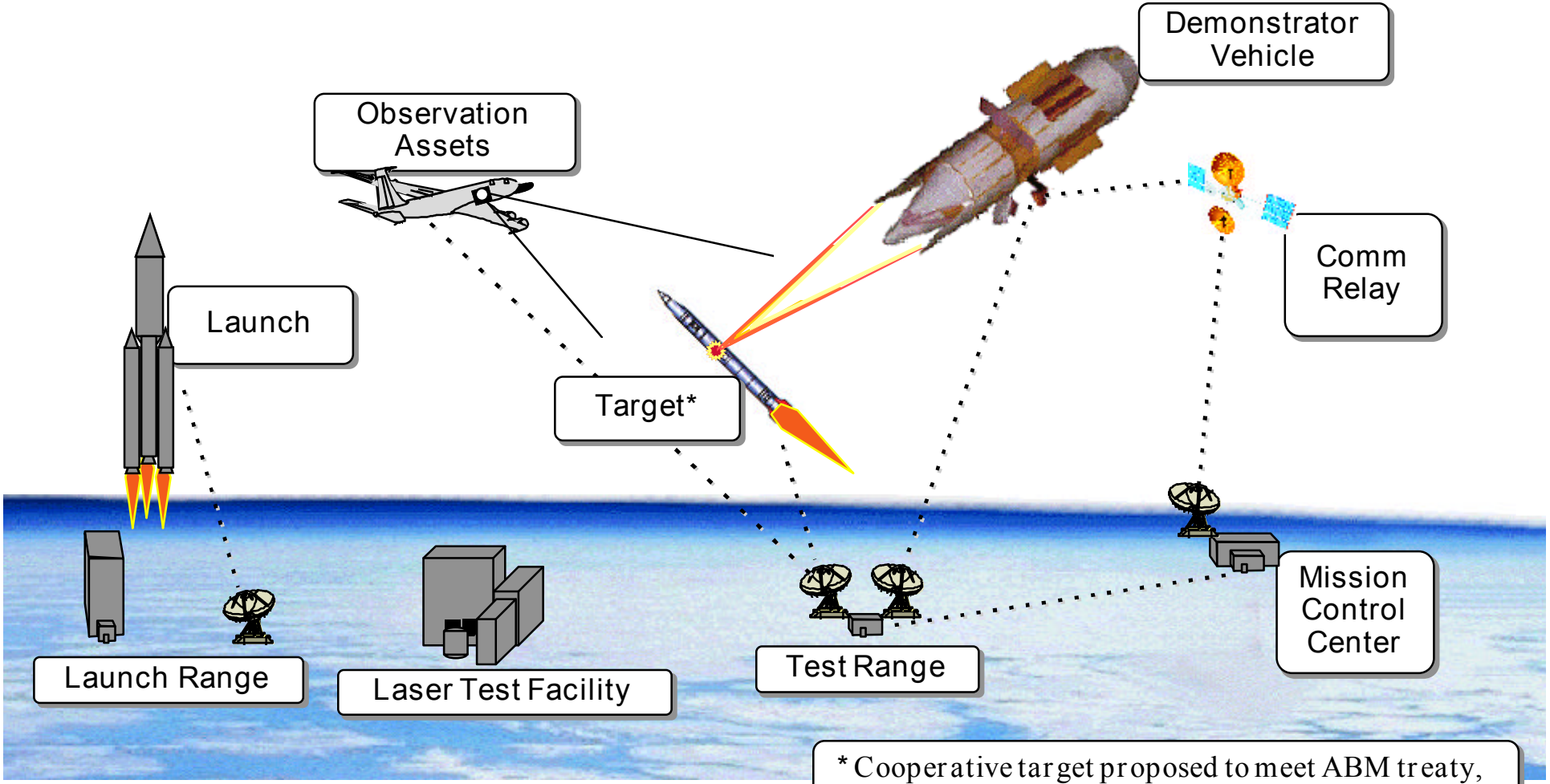
- What, where, when?
  - Key Technical and Programmatic documents
  - W. Coast: Bldg 80, Room A1, 14800 Aviation Blvd, Lawndale, CA.
  - E. Coast: BMDO location to be determined
  - Sep 97
- Notes:
  - Many files available electronically: Bring 3.5" floppy or Zip™ disks
  - Library visits by appointment only
  - Watch for information on SBL Project web page
  - Library Policy and Procedures
  - Submit questions/comments regarding library to SBLRD e-mail account

Project Description

- Background
- Demonstration Overview
- Development Concept & On-going Efforts
- Technical Library
- Acquisition Factors



Demonstration Scope

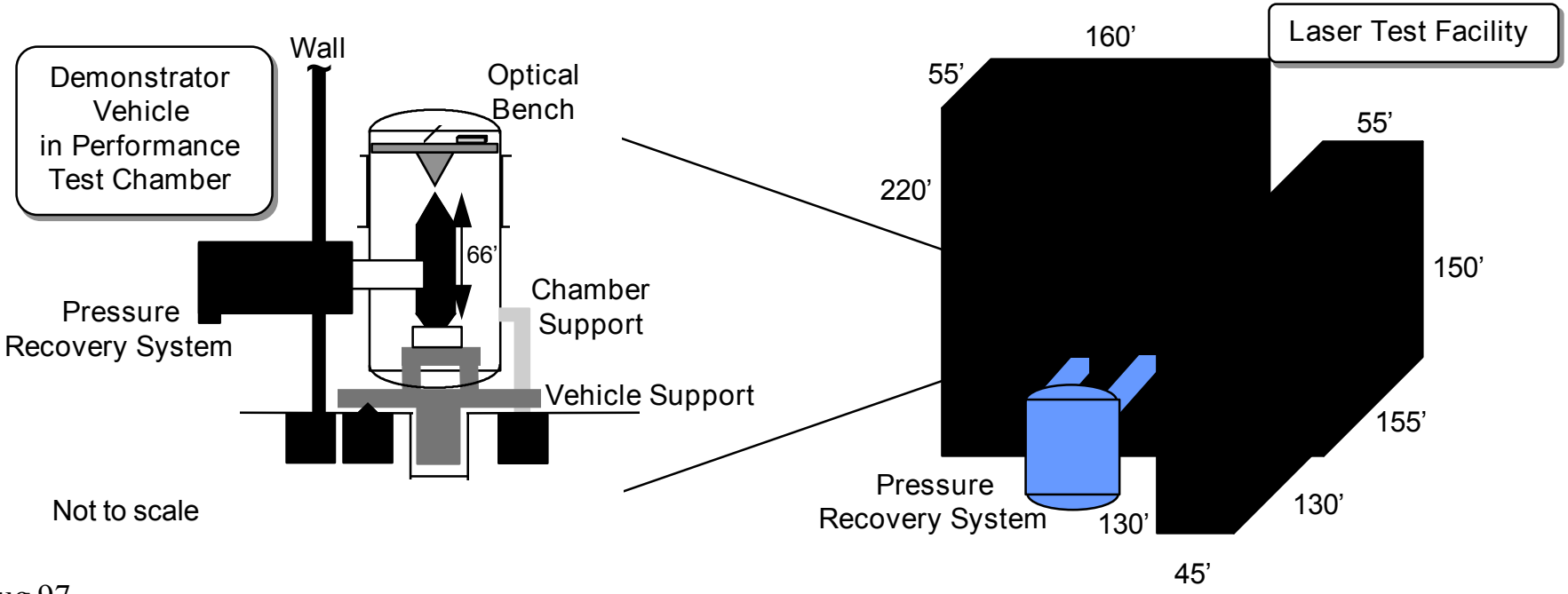


Launch Services

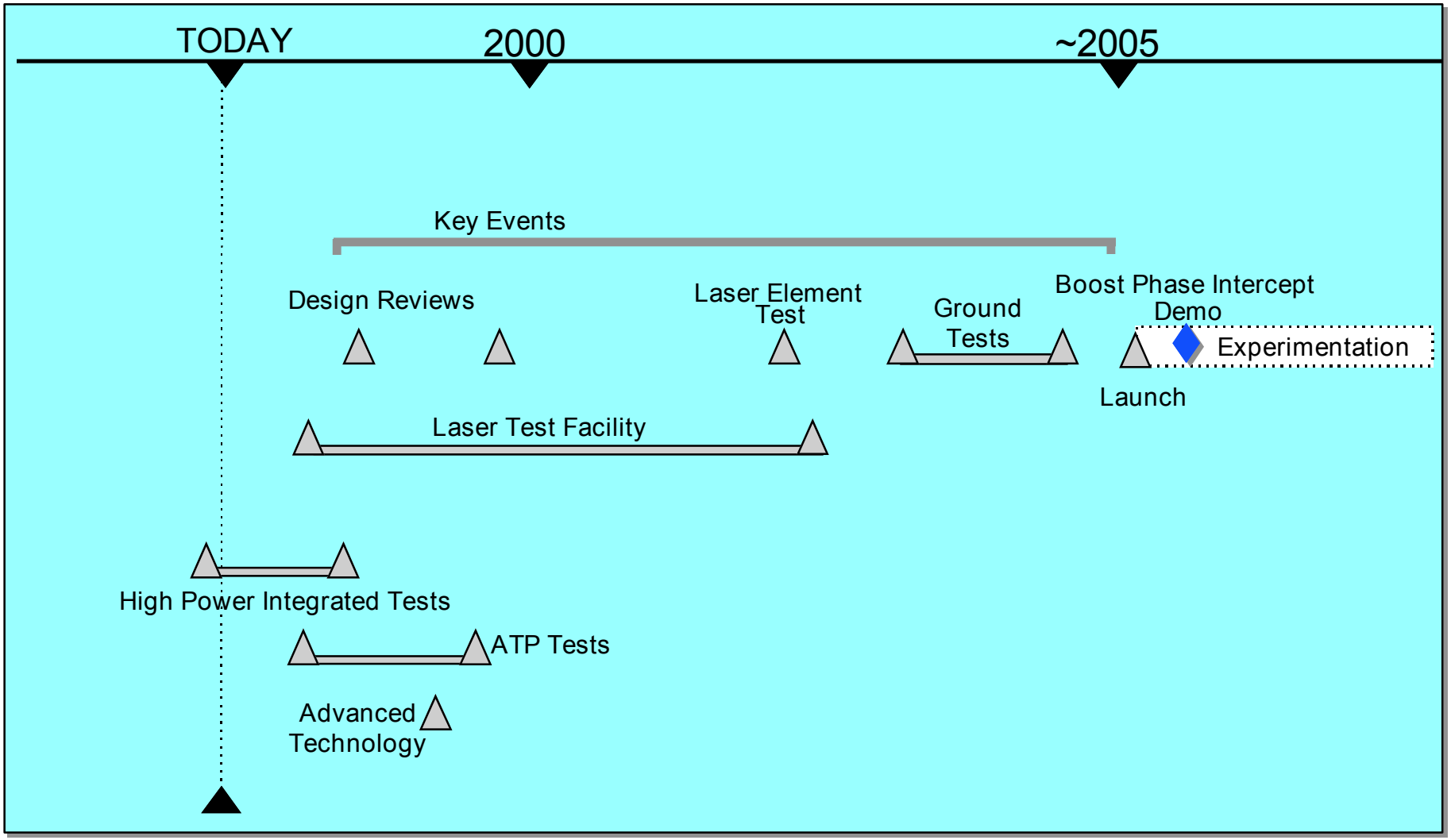
- Current concept requires heavy lift vehicle
- Sizable portion of total cost of effort
- Launch approach in work
  - Titan-IVB availability after 2004 questionable
  - EELV-Heavy
    - SBLRD not in mission model
    - Standard Interface Specification (SIS) in draft
- Contractor acquired or GFE?

SBLRD Laser Test Facility (LTF)

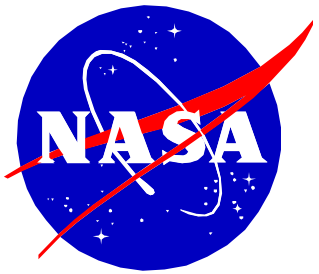
- At 60% design (Corps of Engineers)
- Site selection on hold, four sites under consideration
  - Redstone Arsenal, Stennis Space Center, Kennedy Space Center, and Cape Canaveral
- Government or contractor build?



Notional AF SBLRD Project Schedule



NASA and Additional AF Interests in SBLRD



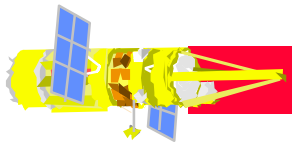
- NASA interest in the SBLRD
  - Technology
    - Optics, pointing and control, materials
  - Facilities
    - Existing investment utilization
    - Rational new investments
  - Operations
    - Use as science instrument, safety
- AF interested in SBLRD capability to assess non-missile defense missions for future SBL
  - Where enabled by large optics and/or high energy laser
  - Experiments minimally impact SBL project (risk, cost, etc)

Risk Mitigation
Major Element of Effort

- Cost
  - Revised cost estimate in process ~ Sep 97
- Schedule
  - Tied to funding received
- Technical (Performance)
  - Laser element- uncooled optics, autonomous resonator alignment
  - Optics element - wavefront sensing, coatings/gratings, autonomous alignment, boresighting
  - Vehicle Integration, particularly weight, vibration, & software
- Other
  - Long term support
  - Laser Test Facility
  - ABM Treaty

General Session Agenda

- 0700-0800 Registration
- 0800-0815 Welcome
- 0815-0830 Administrative Items
- 0830-1000 Project Description
- 1000-1020 Break
- 1020-1045 Project Description
- 1045-1145 Acquisition Approaches
- 1145-1200 Questions/Concluding Remarks



Acquisition Objectives

- Procure in the most efficient, effective manner possible
  - Provide Government insight, not oversight
  - Increase flexibility
  - Execute efficiently available funding
- Obtain expected products:
  - Reduced risk for SBL concept
  - Technology legacy to future operational possibility
  - Knowledge (data on operational, military, scientific utility)
  - Decisive demonstration of concept

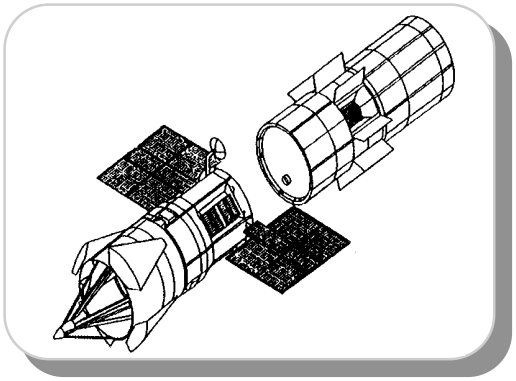
Ground Rules

- ABM Treaty compliance
- SBLRD is a technology demo, not a weapons system acquisition program
- Must show viable plan for ~2005 demonstration
- Must adapt to funding fluctuations
- Foreign involvement restrictions
  - Limits on Ballistic Missile Research & Development
  - Buy American Act
  - Export Control of Critical Military Technology
  - National Space Transportation Policy

SBLRD Must Be ABM Treaty Compliant

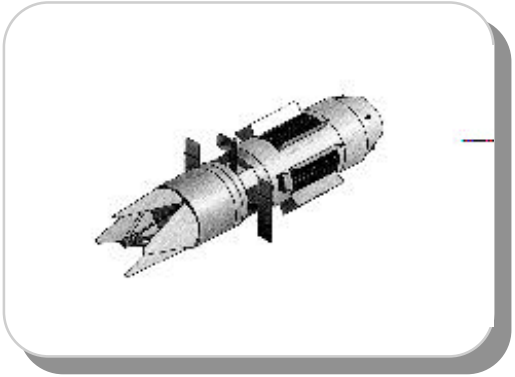
Inherent & Designed Limitations

Original Zenith Star Configuration



- Non-ABM orbit
  - 400 km, 28.5 degrees
- Cooperative target needed
  - Known launch point & time
- Limited range and brightness
- ABM unresponsive availability
  - Sensors & laser warm-up period before engagement
  - Limited "ready" status time
  - Fuel system conditioning & battery recharging between engagements
  - ~15 shot capability

Current Demonstrator Configuration

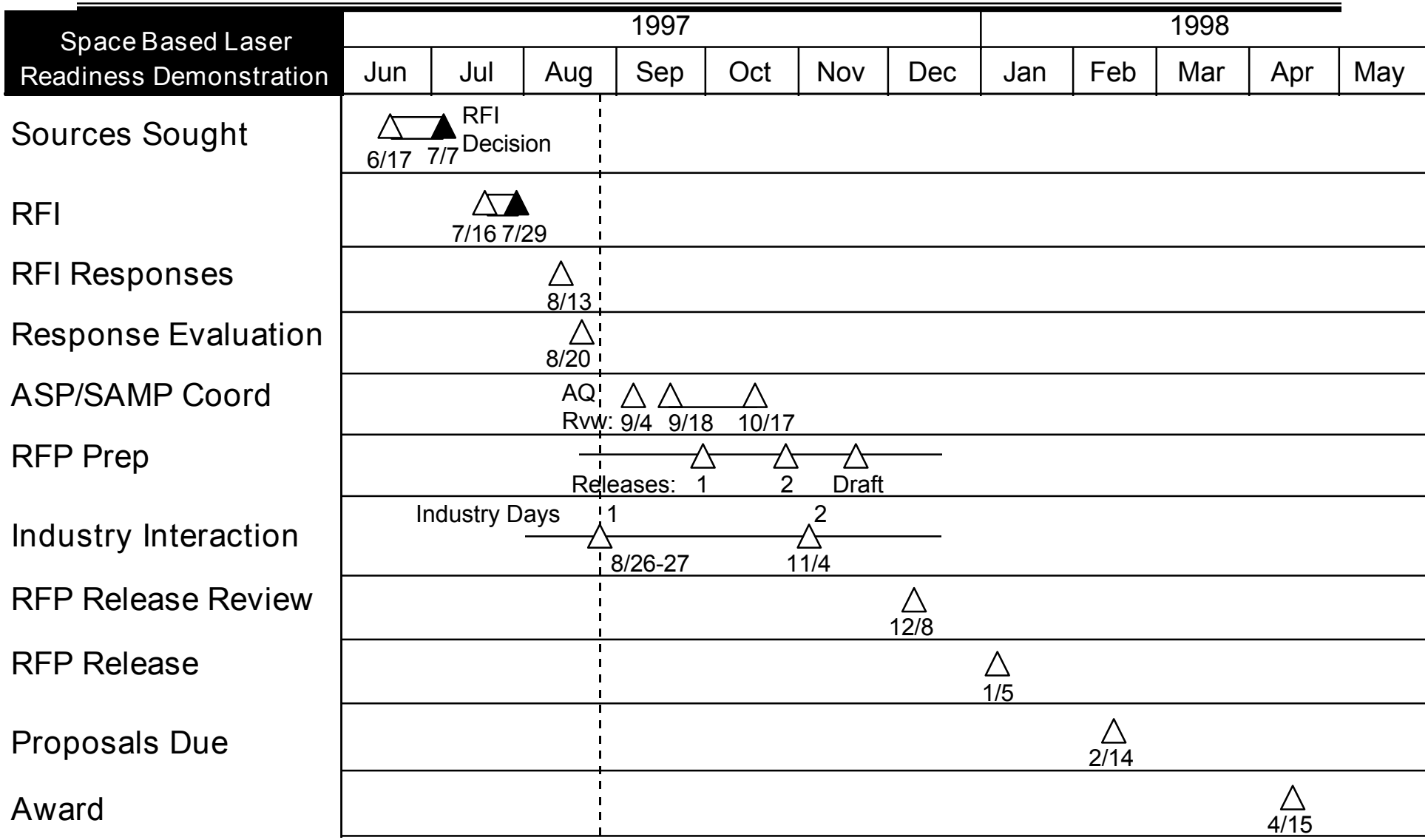


"Fully Compliant" CRG Review in Late '80s

New CRG Review at Appropriate Time

CRG - Compliance Review Group

Notional Acquisition Schedule



Investigation of Alternatives

- The Government has evaluated multiple alternatives
- Government expectations
  - Vest contractor with Total System Performance Responsibility (TSPR)
  - Capitalize on acquisition reform initiatives
  - Exploit Integrated Product & Process Development (IPPD)
  - Use of cost risk assessments and implementation of CAIV
  - Best value evaluation
- Strawman approach formulated, need feedback

Need your INNOVATION!

Current Approach

"Total System Performance Responsibility Concept"

- Government procure SBL project from single source
  - Single entity or team
- "Source" responsible for execution of SBL project
  - Executes project with Government insight
  - Maximizes contractor flexibility and control
- Gets Government out of the micro-managing business
  - Minimizes Government resources required
  - Circumvents problems with Government integrating system
  - Maximizes industry's expertise

Current Approach (Con't)

- Streamlined Government involvement options:
  - Minimal Government presence
    - Contractor acts as the SBL project office
    - Contractor responsible for all interfaces
  - Limited Government presence
    - Participation limited to tracking project execution to plan
    - Project office handles Governmental interfaces
  - Participative involvement
    - Government contributing member on Contractor's IPTs
    - Analysis, comment, contribution, but not direction
- Need your thoughts on these alternatives

Definitization Process

- Government communicates its thresholds/goals
  - Statement of Objectives (SOO)
  - Technical Requirements Document (TRD)
- Contractor prepares and proposes a SBL Roadmap and its Integrated Program Execution Plan (IPEP)
  - Roadmap - top level Integrated Master Plan (IMP)
  - IPEP - combined detailed IMP, Integrated Master Schedule, and Statement of Work
  - Roadmap contractual, IPEP not
  - IPEP fidelity high for near term milestone, less so for future

Notional Key Milestones

- Milestones evolve total project
  - Risk reduction steps
  - Fabrication
  - Facility beneficial occupancy date
  - Integrated system ground test
  - Flight demonstration
- Final delivery of each milestone includes updated IPEP - higher fidelity

Scope of Acquisition

- SBLRD
  - Technologies baselined in RD
  - Other technologies that could reduce SBLRD risk
  - SBLRD demonstration efforts (design, fab, test)
  - Test facility
- Special studies
- SBL risk reduction technologies
  - Laser technologies not directly related to the SBLRD
  - As directed

Procurement Method

- Government has looked at many different options
  - FAR Contract vs. Other Transaction agreement
  - Contract types, scope, performance periods
- Need your ideas on best mix of incentives
  - Award fee
  - Technical/performance
  - Cost control
  - Schedule
- Industry has expressed interest in "Other Transactions" procurement instrument

Section 845
"Other Transaction" Authority

- Section 845 of National Defense Authorization Act of 1994
- Extended to services by NDAA of 1997
- Provides authority to use 10 U.S.C. 2371
- USD(A&T) letter to services 14 Dec 96
- Early and strong interest in OTs for prototypes
  - "Prototype" broadly defined
  - Includes technology demonstrations
- Air Force developing OT policy (HQ AFMC/PKT)

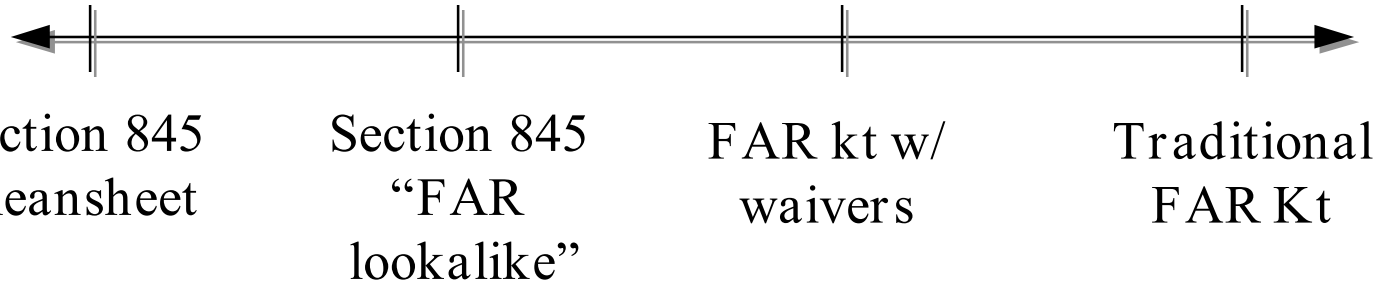
Section 845
"Other Transaction" Authority

- What does Section 845 get you?
  - Relief from FAR and supplement requirements, e.g., cost accounting and reporting
  - Flexibility to use the "best" elements
- Conducted outside of procurement laws and regulations
- Competition to the maximum practicable extent
- Contractual relationship based on sound business judgment and the "Freedom of Contract" principle
- Substantial dialogue with DARPA ongoing

Interested in your opinion!

Section 845
"Other Transaction" Authority

- Spectrum of possibilities:



- "Lookalike" allows us to keep structured framework
- Relief from terms and conditions upon mutual consent

Other Considerations

- Competition
  - Ability to meet the SOO, TRD
- Commercial benefits?
  - Component technologies
  - Missions
- Government Furnished Equipment
- Launch
- Laser Test Facility
  - Design, Construction

Next Step

- Project office interaction with Industry
- Formulate acquisition strategy
- Present strategy to Acquisition Strategy Panel
- Roll approved strategy into the Single Acquisition and Management Plan
- Obtain approval
- Proceed with acquisition

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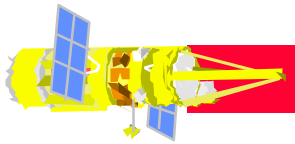

Conclusion

- Government looking for most efficient method of SBL procurement
- Must operate within constraints
- Want your "out of the box" thinking on approaches
- Thank you for your attendance
- We look forward to working with you

Partnership is the goal!